13. Sampling by Variables:

Jacobson's nonogram, methods of determining sample size, consumers and producers risks, MIL STD 414, Variables sampling applied to machine and process capability.

14. Analysis of Variance:

Single factor and two factor situation, use of range in place of standard deviation.

15. Analysis of Variance:

Analysis of components of variance.

16. Correlation and Regression—Introduction:

Covariance, linear relationships between two variables, correlation coefficient. Line of regression.

LECTURER:

Mr. S. M. Prout, P.Eng.,
Senior Member, A.S.Q.C.,
Design Engineer,
Canadian Controllers Ltd.

17. Tests of Significance:

't' test for the comparison of two averages.

18. Tests of Significance:

'F' test for the comparison of two variances or standard deviations.

19. Tests of Significance:

'Chi' square test, frequency data and contingency tables.

LECTURER:

Mr. W. Sawyer, P.Eng.,
Member, A.S.Q.C.,
Quality Control Engineer,
Canadian General Electric Co.,
Peterborough.

20. Review of Course.

Writing requisites and MIL STD 105 will be supplied.

Text for course:

Quality Control & Industrial Statistics,
Acheson J. Duncan.
Publisher: Richard D. Irwin, Inc.

P80 0225
·(76)

UNIVERSITY OF TORONTO
UNIVERSITY EXTENSION

Session 1960-61

Course in

QUALITY CONTROL THROUGH STATISTICAL METHODS

in co-operation with the

TORONTO SECTION,
AMERICAN SOCIETY FOR QUALITY CONTROL

QUALITY CONTROL THROUGH STATISTICAL METHODS

Tuesdays **20 Lectures**

The control of quality of a manufacturing operation or process demands two major requirements. The first is the scientific control of the operations and the second, the methods of collecting and analysing information about the process which can be relied upon. This is done by applying special techniques based upon known and tried statistical theories. This course, which reviews briefly the content of the introductory course is mainly concerned with demonstrating what these techniques are, how they can be applied, where they are suitable and how they operate. Also, the analysis of the information is important. The coverage of the course will include the classical techniques and many of the new ones for which tables and procedures are now readily available. The importance of this course is to show that quality control is far more than scientific inspection, but is a management tool of great value.

Minimum Requirements:

High School mathematics with a knowledge of elementary algebra and graphs. Attendance at a course in Quality Control or Applied Statistics.

COURSE CHAIRMAN:

Mr. V. Ward, B.Sc. (McGill),
Member A.S.Q.C.
Supervisor, Industrial Engineering,
Canadian Industries Ltd.

TIME: 8:00 p.m.
Fall Term: October 11th—December 13th.
Winter Term: January 10th—March 14th.

PLACE: Room T-402, Mechanical Building.

FEE: $40.00.

Registration:

By mail or in person at Room 207, 65 St. George Street, 9 a.m. to 5 p.m. daily, except Saturdays. Information may be obtained by telephoning WA. 3-6611, locals 301, 304, 526, 527. In order to accommodate students and enable them to enrol during the evenings, registrations will be taken:

Monday, September 12th
Monday, September 19th

from 7:30 to 9 p.m. in the Wallberg Building, corner of St. George and College Streets.

PROGRAMME

1. Introduction to Quality Control:

Historical background, work of Shewhart, Dodge & Romig. The problem, nature and definition of control. Chance and assignable causes. The role of statistical theory. Advantages secured through control. Detection of lack of control. Definition of Quality. Specifications for quality. The organization of a Q.C. programme.

2. Presentation of Data:

The problem of presentation of data, grouped and ungrouped data, simple statistics, measurement of variation. The idea of sampling and probability. Inverse probability. The problem of collecting reliable data, errors of measurement. Nature of variation. The normal law of probability. Gaussian, binomial, poisson and hypergeometric distributions.

LECTURER:

Mr. Allin Deacon, P.Eng.,
Fellow, A.S.Q.C.,
National Director, A.S.Q.C. Deacon & Associates,
Q.C. Consultants.

3. Control Charts—Variables:

X & moving range, X & R or sigma charts, control limits, chart factors, trend charts, charts with modified limits, sensitivity of charts, assignable causes, definitions, bar charts.

4. Control Charts—Attributes:

p, pn, and c charts, control limits, limits with variable sample sizes, charts with two-way limits, table and charts for calculating limits, definitions.

5. Control Charts—Special Charts:

Special forms of control charts, bar charts, charts for median and mid range, sun and range charts, coefficient of variation charts, charts for life tests, control limits and chart factors.

LECTURER:

Mr. R. Cardno,
Senior Member, A.S.Q.C.,
Quality Control Supervisor,
Canadian General Electric Co. Ltd.

6. Sampling by Attributes—Introduction:

Introduction to sampling, operating characteristics of sampling plans, consumers and producers risks, definitions and terminology, acceptance and rejection numbers, sampling tables, Dodge Romig tables.

7. Sampling by Attributes—Sampling Plans:

Sampling plans, single, double, multiple, sequential sampling, MIL, STD, 105B, levels of inspection, normal, tightened and reduced sampling.

8. Sampling by Attributes—Continuous Sampling:

Applicability of continuous sampling, Dodge's C.S.P. 1, 2 and 3 plans, MIL, STD, H107, single level plans, MIL, STD, H106 multi level plans, skip lot and chain sampling plans.

9. Sampling by Attributes—Methods:

Random, stratified, cluster, representative, systematic, replicate, sequential, audit and discovery sampling. Quality assurance plans, G.E. Number Defective plan.

LECTURER:

Mr. R. A. Lucas, Fellow, A.S.Q.C.,
Manager, Quality Control,
International Business Machines Ltd.

10. Sampling by Variables—Introduction:

Tally sheet, zeroed and coded data, C.E. Process Sheet and Slide Rule. Method of reducing calculation, sub sample and range method of obtaining sigma.

11. Sampling by Variables—Graphical Methods:

Probability paper, normal and log normal data. Transformed data.

12. Sampling by Variables:

Analysis of distributions, Hamilton Lot Plot. Check on sample size, non normal, truncated, skewed plots and strays.